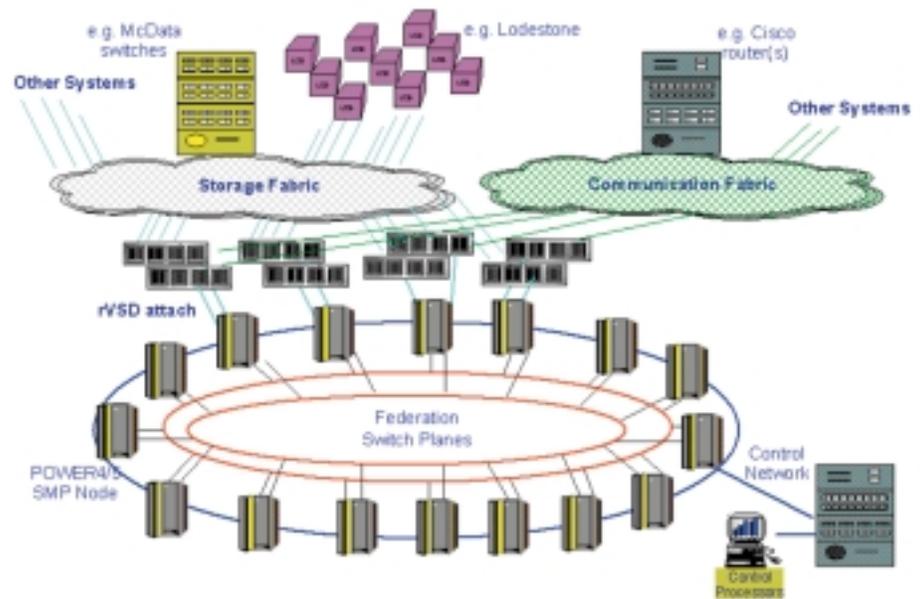


## Facts on ASCI Purple

ASCI Purple ([www.llnl.gov/asci/purple/](http://www.llnl.gov/asci/purple/)) is a partnership between Lawrence Livermore National Laboratory and IBM Corporation for the DOE/NNSA Advanced Simulation and Computing Program (historically known as ASCI). The ASCI Purple contract schedules the delivery of 100-teraFLOP/s peak performance to Livermore in December 2004.



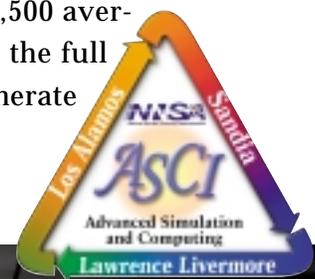
ASCI Purple Infrastructure

Once on-line, Purple will be a shared resource for all three national defense laboratories (Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories) to solve problems in support of the Stockpile Stewardship Program. LLNL and IBM have an outstanding history of success deploying production ASCI systems that include White and Blue-Pacific. Both of these machines continue to provide critical computational capability for weapons scientists across the complex.

The total contract value for ASCI Purple and ancillary equipment is \$290M. This contract has multiple deliveries of hardware to Livermore, of which Purple and BlueGene/L are the two major components. Purple is the 100-teraFLOP/s

( $100 \times 10^{12}$  or one hundred trillion floating-point operations per second) system. It is a genuinely huge machine based on symmetric shared-memory multi-processors (SMP), containing more than 12,000 next-generation IBM Power5 microprocessors.

IBM will deliver the newest high-speed, low-latency interconnect— Federation —for communications between SMPs, achieving in excess of 64 GB/s peak bandwidth. Each SMP has 256 GB ( $256 \times 2^{30}$  or nearly  $275 \times 10^9$  bytes) of memory. The entire Purple system will have 50 TB ( $50 \times 2^{40}$  or nearly  $55 \times 10^{15}$  bytes) of memory and 2.0 PB ( $2.0 \times 10^{15}$  or two petabytes) of globally accessible disk. This is the equivalent of 25,000 high-end personal computers. Purple will require 7.5 MW of electrical power for the computer and cooling equipment, the equivalent electrical power of 7,500 average homes. Additionally, the full system is expected to generate



more than 16,000,000 BTU/hour in heat, requiring new air-handling designs and specifications. ASCI Purple will occupy the new

Terascale Simulation Facility currently under construction at Lawrence Livermore National Laboratory.

## Purple\* at a glance

### Number

### Attribute

100 teraFLOP/s .....	Peak computational rate
50 TB (50×2 <sup>40</sup> bytes).....	Aggregate memory
2.0 PB (2.0×10 <sup>15</sup> bytes).....	Aggregate global disk
106 GB/s (106×10 <sup>9</sup> bytes/seconds) .....	Delivered global I/O bandwidth to applications
12.6 TB/s (12.6×10 <sup>12</sup> bytes/seconds) ....	Aggregate intra-SMP link bandwidth
223 (443) TB (in 10 <sup>12</sup> bytes).....	Aggregate local disk (mirrored) capacity
>10,000 .....	Number of disk drives in the system
40 GB/s (40×10 <sup>9</sup> bytes/seconds) .....	Delivered aggregate local I/O bandwidth to applications
32 x 10-Gb/s Ethernet (in 10 <sup>9</sup> bits/seconds) ...	External networking
>12,000 .....	Number of processors
Power5 .....	Microprocessor technology
7.5 MW (7.5×10 <sup>6</sup> Watts) .....	Power required for computer and cooling
>16,000,000 BTU/hr.....	Heat generated

\* target specifications